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M E M O R A N D U M

Date: March 2, 2006

To: Jose Palomo/Mark Rawson, California Energy Commission

Cc: Dave Michele, Edan Prabhu, Chuck Solt

From: Chuck Whitaker

Re: IEEE 1547 Series Meeting, January 31-Feb 2 2006, Atlanta, GA

I attended the above meeting on behalf of the Commission. There were separate meetings for each of the active projects as shown in the agenda:

Jan 31 Tuesday
8:30 am - 5pm P1547.3 (Information Exchange)
8:30 am - 5pm P1547.4 (DR Islanding Systems)

Feb 1 Wednesday
8:30 am – 3pm P1547.3 (Information Exchange)
8:30 am - 3pm P1547.4 (DR Islanding Systems)

Feb 2 Thursday
8:30 am – 5pm P1547.2 (Guide to 1547)
8:30 am - 5pm P1547.6 (DR/Networks)

Feb 3 Friday
8:30 am – 3pm P1547.2 (Guide to 1547)
8:30 am - 3pm P1547.6 (DR/Networks)

P1547.2 *Application Guide to 1547* Dick Friedman, Chair; Bob Saint, Vice Chair; Tom Basso, Secretary
Feb 2, 2006 8:30am – 5pm and Feb 3, 2006 8:30 am – 3pm.

P1547.3 *Information Exchange* Frank Goodman, Chair; Joe Koepfinger, Vice Chair; Tom Basso, Secretary
Jan 31, 2006 8:30am – 5pm and Feb 1, 2006 8:30 am – 3pm.

P1547.4 *DR Islanding Systems* Ben Kroposki, Chair; Tom Basso, Secretary
Jan 31, 2006 8:30am – 5pm and Feb 1, 2006 8:30 am – 3pm.

P1547.6 *Recommended Practice for Interconnecting Distributed Resources With Electric Power Systems Distribution Secondary Networks* Joe Koepfinger, Chair; Tom Basso, Secretary
Feb 2, 2006 8:30am – 5pm and Feb 3, 2006 8:30 am – 3pm.

For reasons of economy, I attended only the 1547.6 sessions on Feb 2 & 3. Scott Lacy of SCE and Moh Vaziri of PG&E were also in attendance, and likely have additional perspective to add to these discussions.

Summary

Attendance was light compared to past 1547 meetings, with what seemed to be a significant utility majority and a dearth of DG manufacturers/integrators. As this meeting was more about beginnings (second meeting for .4, first meeting for .6, .5's first meeting was held at the PES meeting in San Francisco) than endings (.1 is done, .2 and .3 are both a ways from completion), I think some people felt this was a meeting that could be missed.

1547.2 Application Guide.
Did not attend; WG minutes attached (P1547-2-Minutes-20060202.pdf).
Several people mentioned that they felt the document wasn't as far along as hoped but others were more satisfied with progress. Scott Lacy participated in this workgroup and may have more comments.

1547.3 Application Guide.
Did not attend; WG minutes attached (P1547-3-Minutes-20060201.pdf).

1547.4 Islanding Systems. .
Did not attend; WG minutes not yet available. Ben Kroposki, Chair, forwarded me the following summary:

We held the working group meeting for IEEE P1547.4 *Draft Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems*. Over 30 participants reviewed Draft 1 and added additional material for the next draft. This document provides alternative approaches and good practices for the design, operation, and integration of distributed resource (DR) island systems with electric power systems (EPS).

1547.6 Network Interconnections. This was the second meeting for this document. The meeting was relatively well attended (33), with utilities Joe Koepfinger, IEEE Emeritus, Standards Board Member, retired from Duquesne Light Co, is the chairman, Tom Basso of NREL is secretary. Joe gave a quick review of the status and activities since the last meeting.

Presentations were made by the writing groups, and the organization of the document was discussed. There were several comments about overlapping content of sections 7 and 8. John Bzura of National Grid took these comments to heart and presented, on day 2, a revised outline.

Rather than splitting into separate breakouts, the entire group reviewed parts of Section 7. The discussion was led by John Bzura, Larry Gelbien (NSTAR), and Moh Vaziri (PG&E). The presence of several experienced protection equipment manufacturers (Cutler Hammer, Eaton, Basler) provided yet another source of credible information. Like the previous meeting, utility representatives seemed to be the largest group including several new faces, but there were also DG suppliers, (ASCO, Ingersol Rand, UTC Fuel Cell). There were obvious entrenched positions but it appears that for the most part there is a genuine interest in achieving reasonableness. There's a long way to go before this document is complete.

See detailed notes below and attached WG minutes (P1547-6-Minutes-20060202.pdf)

Detailed Notes
Feb 2, 2006

1547.6 Meeting

Intro by Joe Koepfinger
Presentations by various writing groups

John Bzura, Natl Grid: 7.1.1.2/7.2.1.2 Planning Considerations
Looked at info provided by group members and outside docs.

Larry Gelbien, NStar: 7.1.1.3/7.2.1.3Protection Considerations and settings

Jim Watt, Ingersoll Rand: 8. Essential Issues to be Addressed
General vs Network type (spot or grid) specific issues

Murray Davis
Presented his thoughts/DTE solutions in a paper sent earlier in the week (P1547-6-CL-7-2-1-2-6 Davis-20060130.pdf)

Discussed organization of the working groups, document, rooms, lunch,

Combined Planning & Protection group discussion.

The primary function of a protective relay scheme for a power systems comprising a DR asset for parallel operation with the grid should be to separate the power source (with no intentional time delay) on the occurrence of an anomaly

Reverse Power Relay (or reverse flow?) –
At the protector, at the PCC

Discussed various fault situations—some undetectable

Discussed fault capabilities of different units
Inverters can typically provide 1.2-2.0 pu fault current for a period from sub-cycle to seconds.
Induction—generators are very similar to motors w/r/t/ fault output, though there are some differences in the decay time. 6-7 PU for ¼ cycle.

Synchronous – add trip to generator breaker at 1 PU to separate power sources in 3 cycles or less. Network could see 6-10 times normal current for 3 cycles

Dan Samon gave some comments from Con Ed's perspective. Incited lots of discussions about low load conditions and related NP opening.

Went through a number of what if scenarios/issues.

Feb 3, 2006

Betty Tobin described Networks in Seattle. There is a Network tutorial on the IEEE web site http://grouper.ieee.org/groups/td/dist/sop. It's in a protected area but she was willing to share the document with working group members.

Discussed the potential impact of Net Metering. John Bzura noted an increase in PV system size over the past few years. Had the CEC data on my laptop and discovered a similar trend in California.

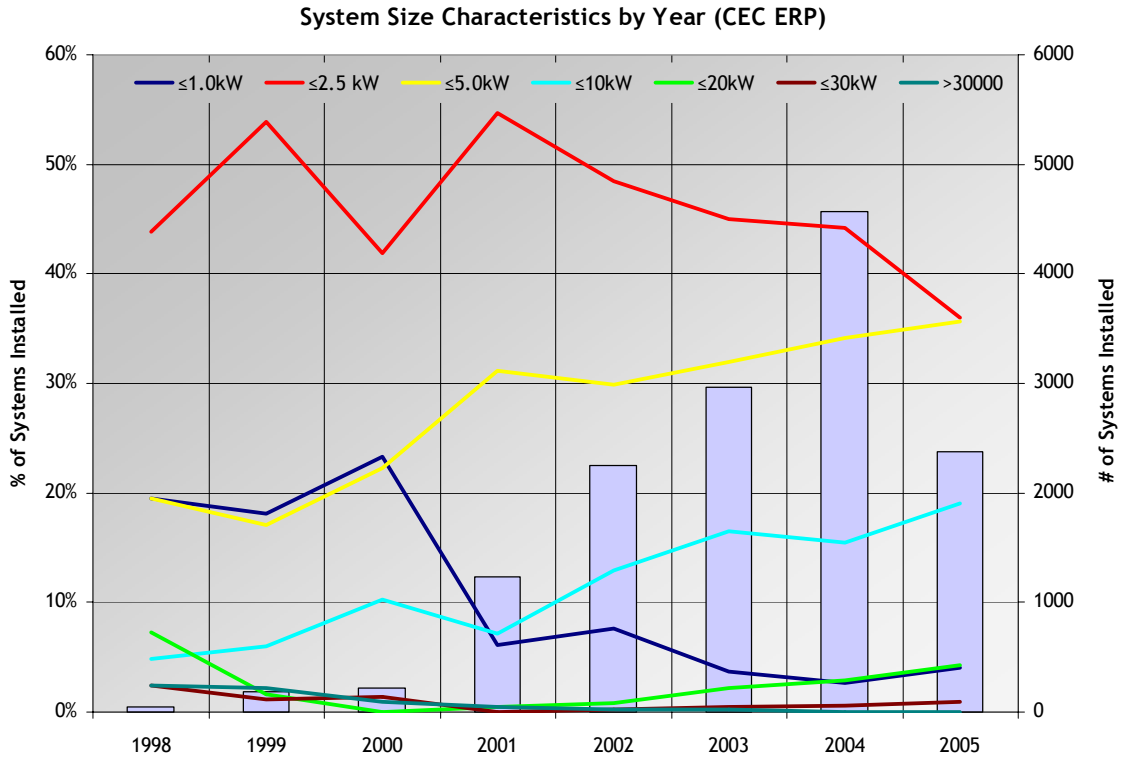

Figure 1 Lines represent % of system installed for that system size; Bars represent total # of systems installed

John Bzura prepared a revised document outline taking into account the previous day's comments. The remainder of the meeting was spent discussing this outline

Next meeting: August?

1 month or so for writing assignments, 2 weeks for review